CLAIMS

We claim:

1. A multi-fluid heat exchanger having separate flow paths for at least two fluid streams to be heated or cooled by a third fluid stream, comprising:

first and second, elongated, spaced, parallel tubular headers having opposed ends;

spaced elongated tube slots in each of said headers with the tube slots in one header facing and aligned with the tube slots in the other header;

a plurality of flattened tubes extending between said headers and having ends received in aligned ones of said tube slots;

one tube slot in each header being unoccupied by one of said flattened tubes, said one tube slots in each header being aligned with each other and located at a predetermined location between the ends of said headers and between two groups of said flattened tubes,

a pair of baffles in each header, one on one side of said one tube slot and between the adjacent tube slot on said one side and the other on the opposite side of said one tube slot and between the adjacent tube slot on said opposite side; and

fins extending between and in heat transfer relation with at least the adjacent tubes in each of said two groups.

2. The multi- fluid heat exchanger of claim 1 further including an additional fin in heat transfer relation with an end tube in each of said two groups, one of

said end tubes being in said adjacent tube slots on said one side and the other of said end tubes being in said adjacent tube slots on said opposite side.

3. The multi-fluid heat exchanger of claim 2 wherein all said fins are serpentine fins and said additional fin has a fin height just greater than twice the fin height of the other fins.

4. The multi-fluid heat exchanger of claim 1 wherein the tube slots associated with one of said two groups are generally uniformly spaced as a group in each of said headers and the tube slots associated with the other of said two groups are generally uniformly spaced as a group in each of said headers.

5. A multi-fluid heat exchanger having separate flow paths for two fluid streams to be heated or cooled by a third fluid stream, comprising:

first and second, elongated, spaced, parallel tubular header having opposed ends;

spaced elongated tube slots in each of said headers with the tube slots in one header facing and aligned with the tube slots in the other header;

a plurality of flattened tubes extending between said headers and having ends received in aligned ones of said tube slots;

a weep hole in each header, said weep holes in the headers being aligned with each other and located at a predetermined location between the ends of said headers and between two groups of said flattened tubes;

a pair of baffles in each header, one on one side of said weep hole and between an adjacent tube slot on said one side and the other on the opposite side of said weep hole and between an adjacent tube slot on said opposite side;

first serpentine fins of a first fin height extending between and bonded to the adjacent tubes in each of said two groups; and

a second serpentine fin of a second fin height greater than said first fin height extending between tubes in said adjacent tube slot on said one side and in said adjacent tube slot on said opposite side.

6. The multi-fluid heat exchanger of claim 5 wherein said second fin height is equal to about twice the first fin height plus the minor dimension of one of said tubes.

7. The multi-fluid heat exchanger of claim 5 wherein the tube slots associated with one of said two groups are generally uniformly spaced as a group in each of said headers and the tube slots associated with the other of said two groups are generally uniformly spaced as a group in each of said headers.

8. The multi-fluid heat exchanger of claim 5 wherein said weep hole is provided in the form of one of said tube slots in each said header, said one tube slot being unoccupied by any of said flattened tubes.

9. A method of making a multi-fluid heat exchanger for at least two fluids to be heated or cooled by a third fluid comprising the steps of:

a) providing two elongated tubular headers with spaced, elongated tube slots extending generally transverse to the direction of elongation of each of the headers;

b) selecting a tube slot for use as a weep hole in each header, with the weep hole tube slot in both headers being in identical positions and installing baffles in each header on both sides of the weep hole tube slot;

c) aligning the headers with their tube slots facing each other and with corresponding tube slots opposite one another;

d) forming a heat exchanger core by sandwiching serpentine fins in alternating relation with flattened tubes having ends dimensioned to be received in said tube slots, with i) all but one of said serpentine fins having a fin height approximately equal to the distance between adjacent tube slots and ii) with said all but one fin having a fin height approximately equal to the distance between two tube slots and located to align with said weep hole tube slots;

e) fitting the headers to the core by causing the ends of the tubes to enter corresponding ones of said tubes slots other than said weep hole tube slots;

f) compressing the core in the direction of elongation of said headers sufficiently to cause the crest of the fins to contact the tubes between which they are sandwiched; and

g) metallurgically bonding the tube ends within the tube slots and the serpentine fins to the tubes between which they are sandwiched.

10. The method of claim 9 wherein step f) precedes at least step c).

11. The method of claim 9 wherein step f) precedes step e).

12. The method of claim 10 wherein step f) precedes step e).

13. The method of claim 9 wherein step b) includes the step of forming baffle receiving slots in said headers on both sides of said weep hold tube slot in each of said headers and inserting baffles into said baffle receiving slots.

14. The method of claim 13 wherein said headers, said fins, said tubes, and said baffles are formed of metal and step g) is preceded by the step of locating a brazing compound at the interfaces of said headers and said tube ends and said baffles and the interface of said tubes and said fins, step f) is maintained during the performance of step g), and step g) is performed by subjecting the assemblage resulting from step e) to an elevated brazing temperature.

15. The method of claim 14 wherein said metal is aluminum or its alloys.

16. A method of making a multi-fluid heat exchanger for at least two fluids to be heated or cooled by a third fluid comprising the steps of:

a) providing two elongated tubular headers with spaced, elongated tube slots extending generally transversed to the direction of the elongation of the header;

b) providing a weep hole in each header, with the weep hole in both headers being in identical positions and installing baffles in each header on both sides of the weep hole;

c) aligning the headers with their tube slots facing each other and with corresponding tube slots opposite one another;

d) forming a heat exchanger core by sandwiching serpentine fins in alternating relation with flattened tubes having ends dimensioned to be received in said tube slots, with one of said fins located to align with said weep holes to extend between a pair of tubes that will be received in tube slots located adjacent said baffles on opposite sides of the baffles from said weep holes, said one serpentine fin having a fin height greater than the other serpentine fins;

e) fitting the headers to the core by causing the ends of the tubes to enter corresponding ones of said tube slots;

f) compressing the core in the direction of the elongation of said headers sufficiently to cause the crest of the fins to contact the tubes between which they are sandwiched; and

g) metallurgically bonding the tube ends within the tube slots and the serpentine fins to the tubes between which they are sandwiched.